



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/702,074	10/30/2000	Yi Liu	100969-147	9095

7590

06/10/2003

Iandiorio & Teska
260 Bear Hill Road
Waltham, MA 02451-1018

EXAMINER

MARTIR, LILYBETT

ART UNIT

PAPER NUMBER

2855

DATE MAILED: 06/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/702,074

Applicant(s)

LIU, YI

Examiner

Lilybett Martir

Art Unit

2855

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☒ Interview Summary (PTO-413) Paper No(s). 14.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-4, 8-10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheen et al. (Pat. 4,598,593) in view of Donelan et al. (Pat. 4,003,256).

- With respect to claim 1, Sheen et al. teaches a first transmitter receiver pair as in elements 20 and 21, a second transmitter receiver pair as in elements 22 and 23, a conduit as in element 41, and a processor as in elements 24-34 operative to correlate a tag-modulated output signal of the first and second pairs to determine a time interval representative of flow (Col. 2, lines 13-16 and Col. 3, lines 8-11 and 20-23). Sheen et al. fails to teach the second transmitter receiver pair being mounted so that the ultrasonic paths of both pairs are antiparallel. Donelan et al. teaches a flow rate-measuring device that comprises first and second pairs of transmitter receivers as in elements 13a, 14a, 13b and 14b where the second transmitter receiver pair being mounted so that the ultrasonic paths 15a and 15b of both pairs being antiparallel as noted in Figure 1 and of harmonic nature (Col. 2, lines 64-68 and Col. 3, lines 28-31). It

would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flowmetering device of Sheen et al. utilizing the teachings of the fluid monitoring device of Donelan et al. by specifically utilizing and arranging the transmitter receiver pairs so that their ultrasonic paths are antiparallel to therefore increase the flow metering device's measuring sensitivity and therefore make said device more reliable and accurate.

- With respect to claim 3, Sheen et al. teaches operating in a frequency range above 100KHz (Col. 3, lines 32-35).
- With respect to claim 4, Sheen et al. teaches operating in a frequency range above and approximately 900KHz (Col. 3, lines 32-35, note that a frequency of 1MHz is a value that is very close to 900KHz).
- With respect to claims 8 and 13, Sheen et al. teaches a first transmitter receiver pair as in elements 20 and 21, a second transmitter receiver pair as in elements 22 and 23, a conduit as in element 41, a processor as in elements 24-32, and a correlator as in element 34 operative to determine a time interval representative of flow (Col. 2, lines 13-16 and Col. 3, lines 8-11 and 20-23). Sheen et al. fails to teach the second transmitter receiver pair being mounted so that the ultrasonic paths of both pairs are antiparallel. Donelan et al. teaches a flow rate-measuring device that comprises first and second pairs of transmitter receivers as in elements 13a, 14a, 13b and 14b where the second transmitter receiver pair being

mounted so that the ultrasonic paths 15a and 15b of both pairs being antiparallel as noted in Figure 1 and of harmonic nature (Col. 2, lines 64-68 and Col. 3, lines 28-31). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow metering device of Sheen et al. utilizing the teachings of the fluid monitoring device of Donelan et al. by specifically utilizing and arranging the transmitter receiver pairs so that their ultrasonic paths are antiparallel to therefore increase the flow metering device's measuring sensitivity and therefore make said device more reliable and accurate.

- With respect to claims 9 and 10, Sheen et al. fails to specifically intend to utilize their flow metering devices in either a steam pipe of a building heating system or a process feed gas pipe of a chemical plant. Both Sheen et al. (Col. 2, lines 28-31) and Donelan et al. teach the utilization of their metering devices in flow paths, conduits or pipes. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations (Ex Parte Masham, 2 USPQ F.2d 1647 (1987)). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flowmetering device of Sheen et al. by utilizing said flow metering means in diverse systems and pipes/conduits to make said means versatile.

3. Claims 2,5-6, 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheen et al. in view of Donelan et al. as applied to claims 1, 8 and 13 above, and further in view of Bruner (Pat. 4,528,857).

- With respect to claim 2, Sheen et al. fails to teach specifically utilizing a different frequency of operation for each pair of transmitter receivers. Bruner teaches an ultrasonic flowmeter where first and second pairs of transmitter receivers as in elements 24,26, 28 and 30 work at different frequencies (Col. 2, lines 31-38). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow metering device of Sheen et al. by utilizing different frequencies of operation in both transmitters as taught by Bruner to prevent cross talk and therefore increase the reliability of a flow-metering device.
- With respect to claim 5, Sheen et al. fails to teach specifically utilizing a different frequency of operation for each pair of transmitter receivers and received signals are demodulated at their transmission frequency. Bruner teaches an ultrasonic flowmeter where first and second pairs of transmitter receivers as in elements 24,26, 28 and 30 work at different frequencies where the received signals are demodulated (Col. 2, lines 31-38). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flowmetering device of Sheen et al. by utilizing demodulation as taught by Bruner to prevent

cross talk and therefore increase the reliability of a flow-metering device.

- With respect to claim 6, Sheen et al. fails to teach the utilization of a frequency of operation in the first pair that is approximately ten percent of the frequency of operation of the second pair. Bruner teaches an ultrasonic flowmeter where first and second pairs of transmitter receivers as in elements 24,26, 28 and 30 work at different frequencies (Col. 2, lines 31-38). Since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art (In re Aller, 105 USPQ 233), It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow metering device of Sheen et al. by utilizing different frequencies of operation in both transmitters as taught by Bruner to prevent cross talk and therefore increase the reliability of a flow-metering device.

- With respect to claim 11, Sheen et al. fails to teach the utilization and attachment of the flow metering device to a pipe or conduit having a diameter of about under two inches. Bruner teaches that it is well known in the art to utilize flow meters in a wide range of conduit sizes (Col. 2, lines 20-24). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow metering device of Sheen et al. by securing a flow-metering device to a

small conduit to make a device versatile and therefore capable of making measurements in smaller conduits that occupy smaller places.

- With respect to claim 14, Sheen et al. fails to teach specifically utilizing a different frequency of operation for each pair of transmitter receivers and received signals are demodulated at their transmission frequency. Bruner teaches an ultrasonic flowmeter where first and second pairs of transmitter receivers as in elements 24,26, 28 and 30 work at different frequencies where the received signals are demodulated (Col. 2, lines 31-38). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flowmetering device of Sheen et al. by utilizing different frequencies of operation in both transmitters to prevent cross talk and therefore increase the reliability of a flow-metering device and its utilization.

4. Claims 7,12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheen et al. in view of Donelan et al. and Bruner as applied to claims 5,8 and 13 above, and further in view of Itoh et al. (Pat. 5,503,035).

- With respect to claim 7, Sheen et al. fails to specifically teach the utilization of a continuous mode. Itoh et al. teaches a flow-metering device where the utilization of continuous waves is stated as known in the art (Col. 8, lines 55-57). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow metering device of Sheen et al. utilizing the teachings of Itoh et

al. by operating it in a continuous mode to therefore increase the efficiency accuracy and reliability of a metering device by making continuous and multiple flow measurements.

- With respect to claims 12 and 15, Sheen et al. fails to disclose attaching ultrasonic transducers to a conduit by clamp on means. Itoh et al. teaches that it is well known in the art to attach ultrasonic sensors by clamping means to a pipe or conduit (Col. 14, lines 30-31 and 48-53). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow metering device of Sheen et al. utilizing the teachings of Itoh et al. by attaching or securing the transducer means in a reliable manner that prevents leaks and simplifies maintenance, therefore making said device more reliable and accurate.

Response to Arguments

5. Applicant's arguments, see Remarks, filed March 20, 2003, with respect to the rejection(s) of claim(s) 1-15 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Sheen et al. (Pat. 4,598,593) in view of Donelan et al. (Pat. 4,003,256).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lilybett Martir whose telephone number is (703)305-6900. The examiner can normally be reached on 9:00 AM to 5:30 PM.
7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (703)305-4816. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3432 for regular communications and (703)305-3432 for After Final communications.
8. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

CM

Lilybett Martir
Examiner
Art Unit 2855

LCM

June 4, 2003


EDWARD LEFKOWITZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800